

OUTLINE

What is Data Communication?
Elements of Data Communication.
Types of Data Communication.
Data Transmission Modes.
Network.
Types of Network.
Topologies.

WHAT IS DATA COMMUNICATION

- ✗ Data communications is the exchange of information between two agents.
- ✗ In other words, we can say that transfer of information or data from one point to another is called data communications.

ELEMENTS OF DATA COMMUNICATIONS

- ✗ There are four elements of data communications.
- ✗ These are: Sender, Receiver, Message, Media.

1.Message: The message is the information (data) to be communicated. popular form of information include text, number, pictures. ,audio, and video.

2.Sender: The sender is the device that sends the data message .

It can be a Computer workstation, telephone handset and so on.



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3.Receiver: The receiver is the device that receives the message, it can be a Computer Workstation, telephone handset, television and so on .

4.Transmission medium: The transmission medium is the physical path by which a message travels from sender to receiver.

When you sending a letter to your friend then you are the sender, Your friend is the receiver and the postal service is the medium. Another example is , If you are receiving a telephone call from your friend then your friend is the sender, you are the receiver and the telephone line is the medium

TYPES OF DATA COMMUNICATIONS:

✕ There are two types of data communications, These are:

1. Serial Communication:

In this type of communication all data is transmitted in a single line in a certain order. This is the slow communication method i.e. one bit at a time.

2. Parallel Communication :

In this communication data in the form of groups is transmitted i.e. in the form of byte or word at a time. This is the fast method of communication.



DATA TRANSMISSION MODES

1.Simplex: in simplex mode the communication is unidirectional .as on a one –way street. Only one of the two device on a link can transmit. The other can only receive . Keyboard and traditional monitors are example of simplex devices.

The keyboard can only introduce input, The monitor can only accept output .

The simplex mode can use the entire capacity of the channel to send data in one direction.

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2. **Half Duplex Transmission:** A half duplex channel transmits data in either direction, but in one direction at a time. It needs two wires for transmission of data. for Example Wireless set, walkie talkie.
3. **Full Duplex:** A full duplex system transmits both directions at a time. A full duplex line is faster, since it avoids the delay that occurs in a half duplex circuit each time the direction of transmission is changed. In this mode communication terminals are capable of transmitting data in both directions at the same time. Example: Telephone line, Mobile

NETWORK

- ✖ When two or more than two computers/devices are connected to each other for sharing data and resources is called Network OR
- ✖ A network is a set of connected Computers for the purpose of Sharing Data and Resources.
- ✖ Sharing of Data/Information is called Networking.

TYPES OF NETWORK

✕ There are three main types of Network which are LAN, MAN, WAN.

1.LAN: LAN is the most common types of network. LAN stands for **local area network**.

it covers a small area, Most LAN are used to connect computers in a single building or groups of building.

A Local Area Network (LAN) is a network that is limited to a small area. It is generally limited to a geographical area such as a lab, school, or building.



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- ✘ In a typical LAN configuration, one computer is designated as the file server. It stores all of the software that controls the network, as well as the software that can be shared by the computers attached to the network.
- ✘ On most LANs, cables are used to connect the network interface cards in each computer. See the Topology, Cabling, and Hardware sections of this tutorial for more information on the configuration of a LAN.

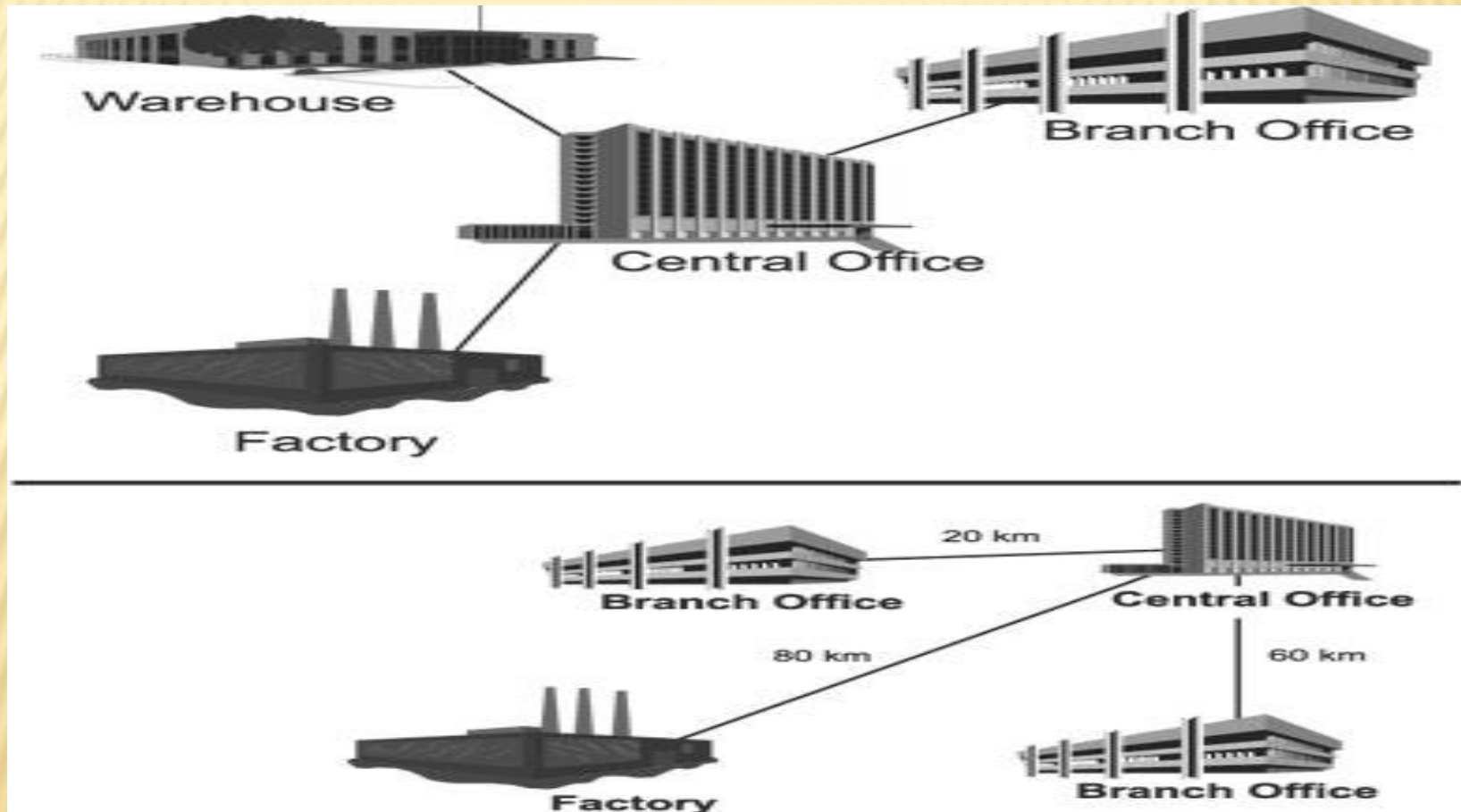
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2. **MAN:** MAN stands for metropolitan area network. It covers a geographical area of the size of a city. A MAN typical include one or more LANs **OR**
 - ✗ It is a network in which computers or networks are connected with in a town e.g. connecting 2 branches of a bank in Same town or city.
3. **WAN:** WAN stands for Wide area network. WAN covers a large area. WANs connects computers in different cities, countries, and continents.

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NETWORK TOPOLOGIES

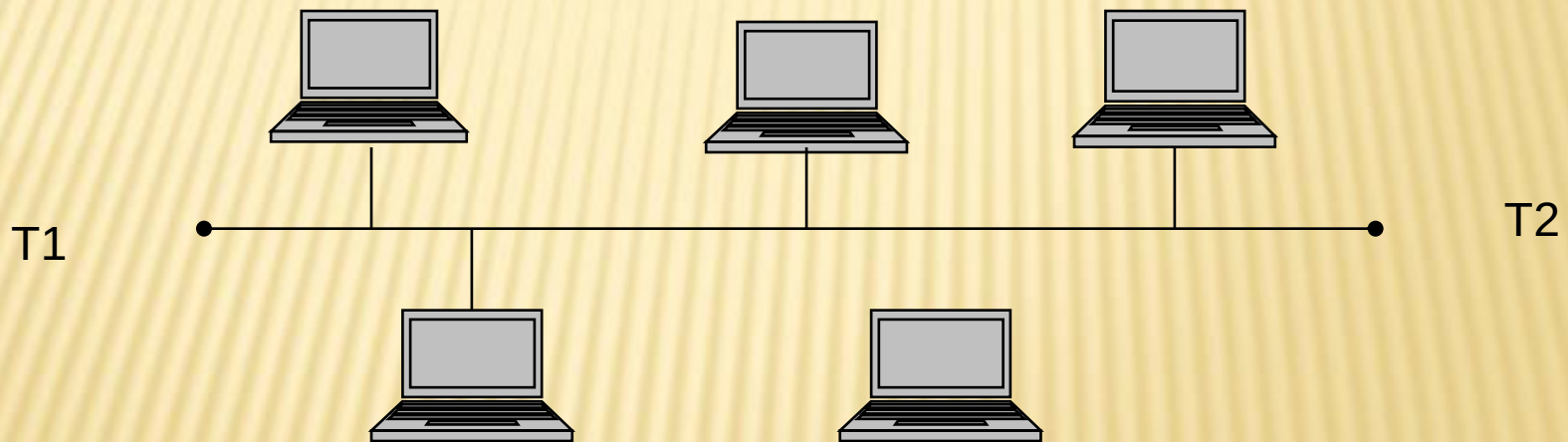
The physical structure of network is called topology. Or the way in which computers are connected to each other is called topology.

Important topologies are as follows.

1. Bus Topology
2. Star Topology
3. Ring Topology
4. Mesh Topology

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1. Bus Topology: The simplest type of topology is the bus topology. In bus topology all computers are connected to a single cable. Coaxial cable is used in bus topology



WORKING OF BUS TOPOLOGY

- ✗ If a computer wants to send data to other computer in the network, it has to determine whether media is in use. If no other device is transmitting then it sends data and destination address via bus. The data and address move from one computer to another computer. Each computer checks the address. If it matches with the address of the computer the computer keeps the data otherwise the data moves to the next computer.

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Advantages:

- A. Simple, easy to install
- B. Less expensive
- C. Easy to extend

Disadvantages:

- A. If Main cable breaks, the whole network fails.
- B. As the number of computer increase, the speed of the network slow down.

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2. Star Topology: A Star network is one in which all computers/Device are connected to a central device called Hub/Switch.

- ✗ If two computers want to share data, the sender computer sends data to the hub and hub sends it to the receiving computer. Each computer on a star network communicates with a central Hub.

- ✗ **Advantages:**

- A. Easy to modify and Add new computers

- B. Easy to trouble shoot

- C. Single computer failure does not break down the whole network

- ✗ **Disadvantages:**

- A. if central Hub fails the entire network fail down

- B. More expensive than Bus topology



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Star topology:

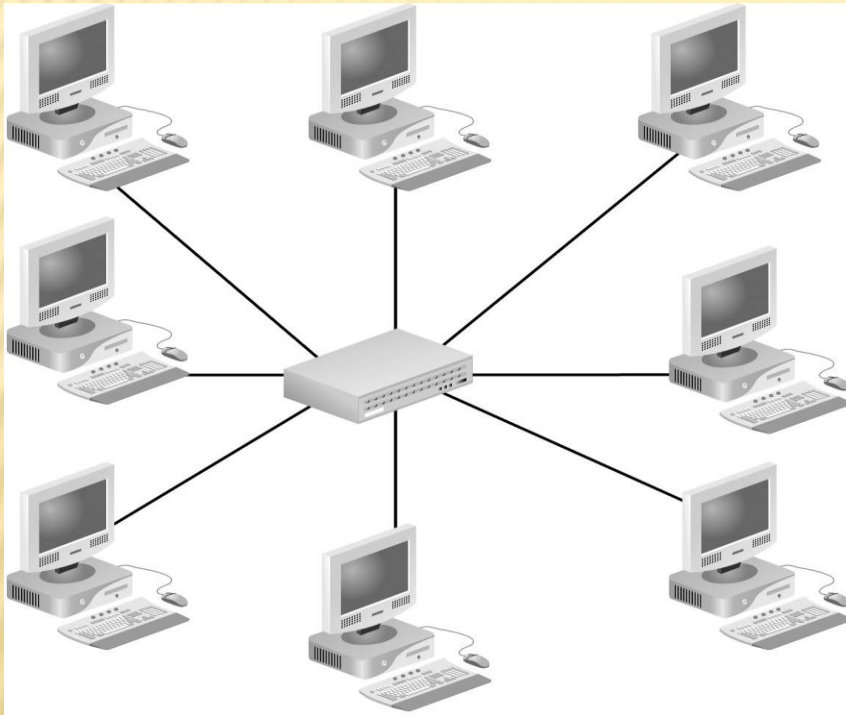
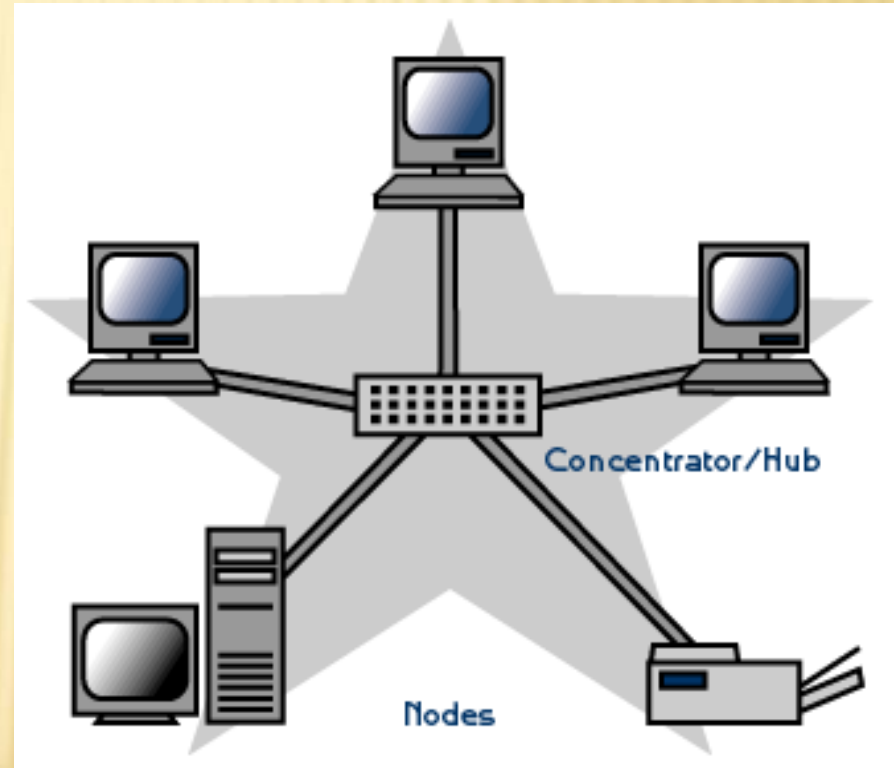


Figure 2-5 Typical star topology network



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3. Ring Topology: in this topology, each computer is connected to the Next computer and the last one computer connected to the first. Data flows around the circle from one device to device in one direction. Ring topology is also known as **Token Ring Topology**.

✖ **Advantage:**

A. Every computer have equal access.

✖ **Disadvantages:**

- A. Failure of one computer can effect the whole network
- B. Difficult to Troubleshoot
- C. Difficult to add new computer

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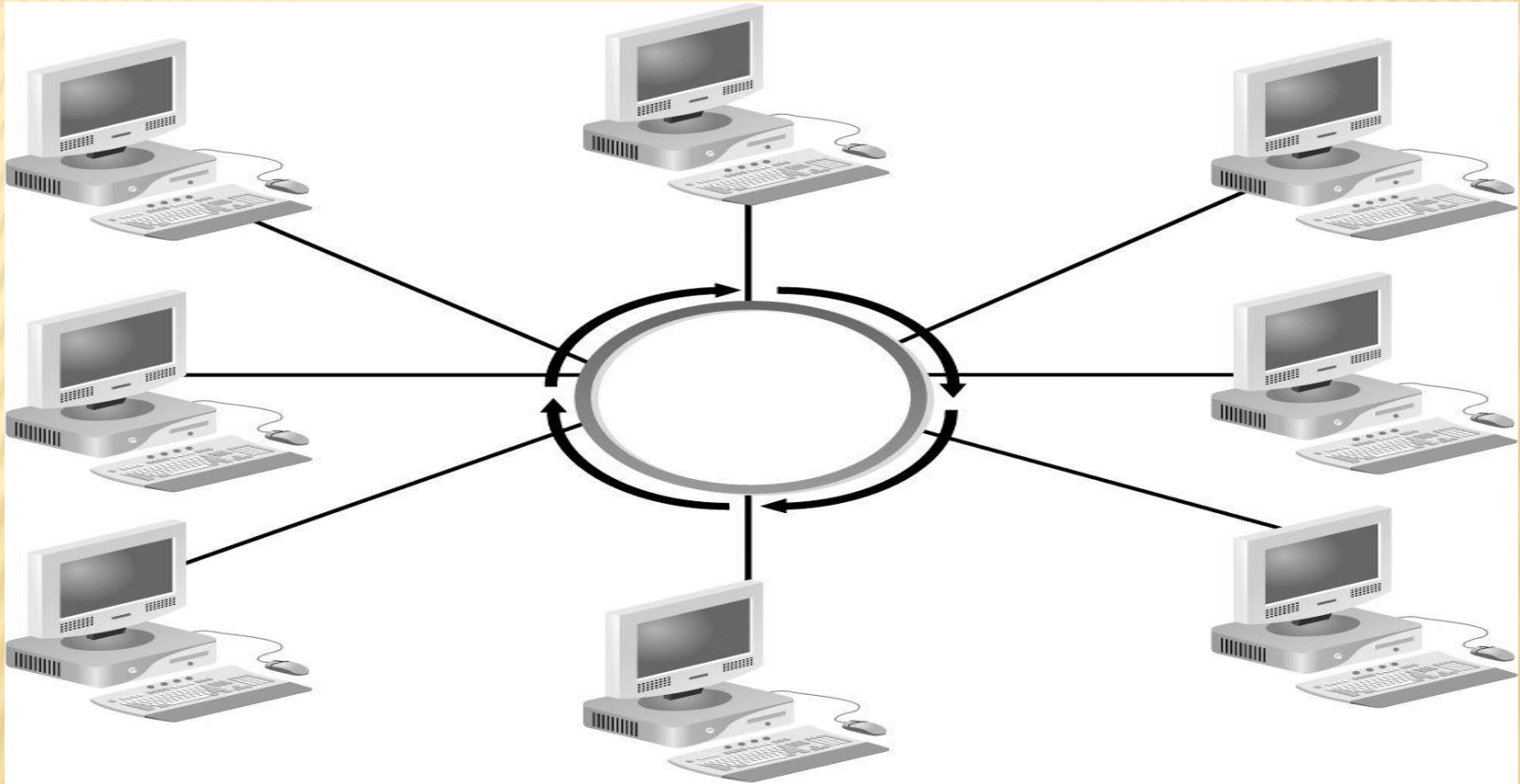


Figure 2-6 Typical ring topology network

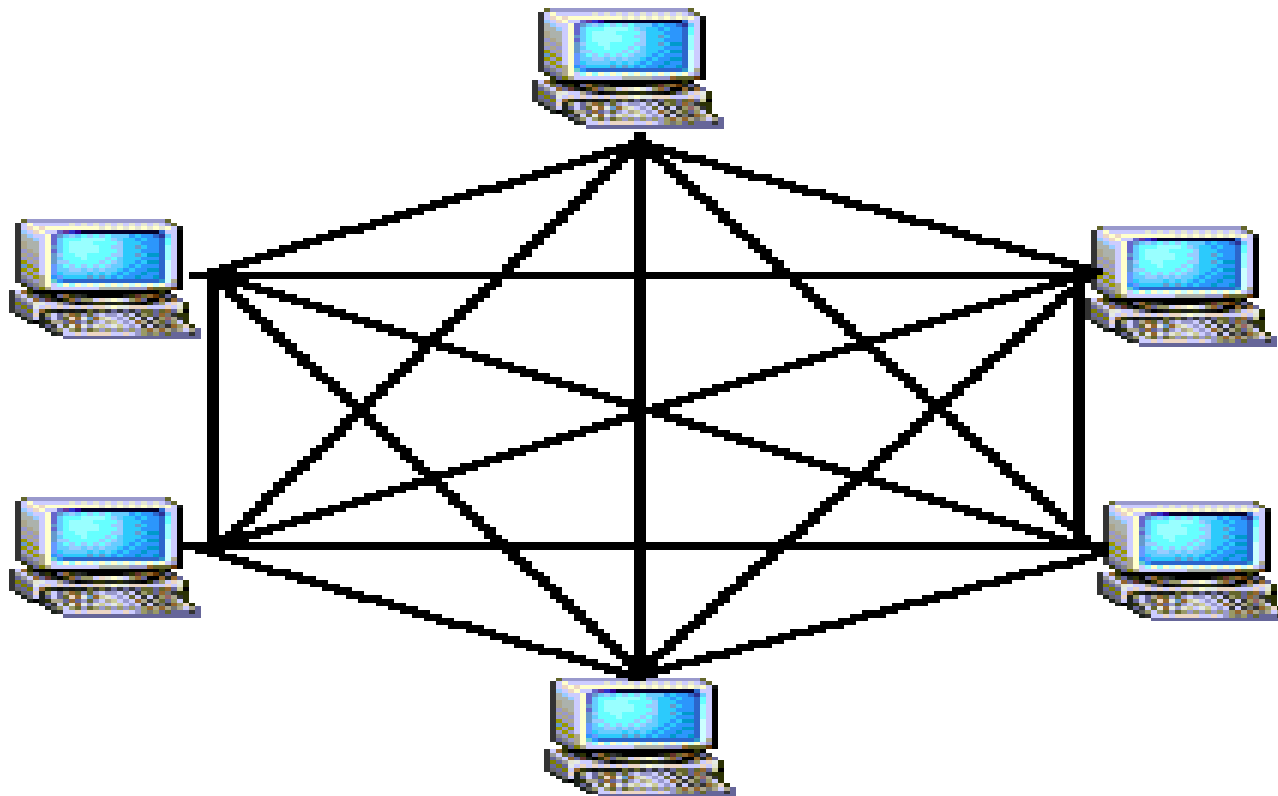
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4. Mesh Topology: In Mesh topology, Every computer/device on the network is connected to every other computer/Device. A message can be sent on different possible paths from Source to destination.

Expensive to implement

- ✗ Difficult to install
- ✗ Difficult to manage
- ✗ Difficult to troubleshoot
- ✗ Internet is mesh topology with multiple paths to key junction points

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Thanks for your attention
Any Questions & Suggestions

